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MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB
SPECULAR REFLECTION TIMING PREDICTIONS FOR THE PERIOD PRECEDING--ETC(U)
JAN 77 A S FRIEDMAN
ETS-8

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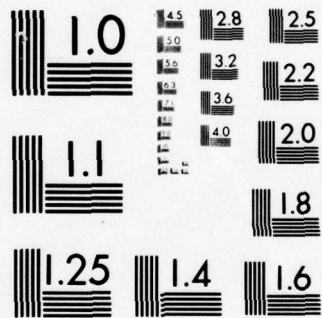
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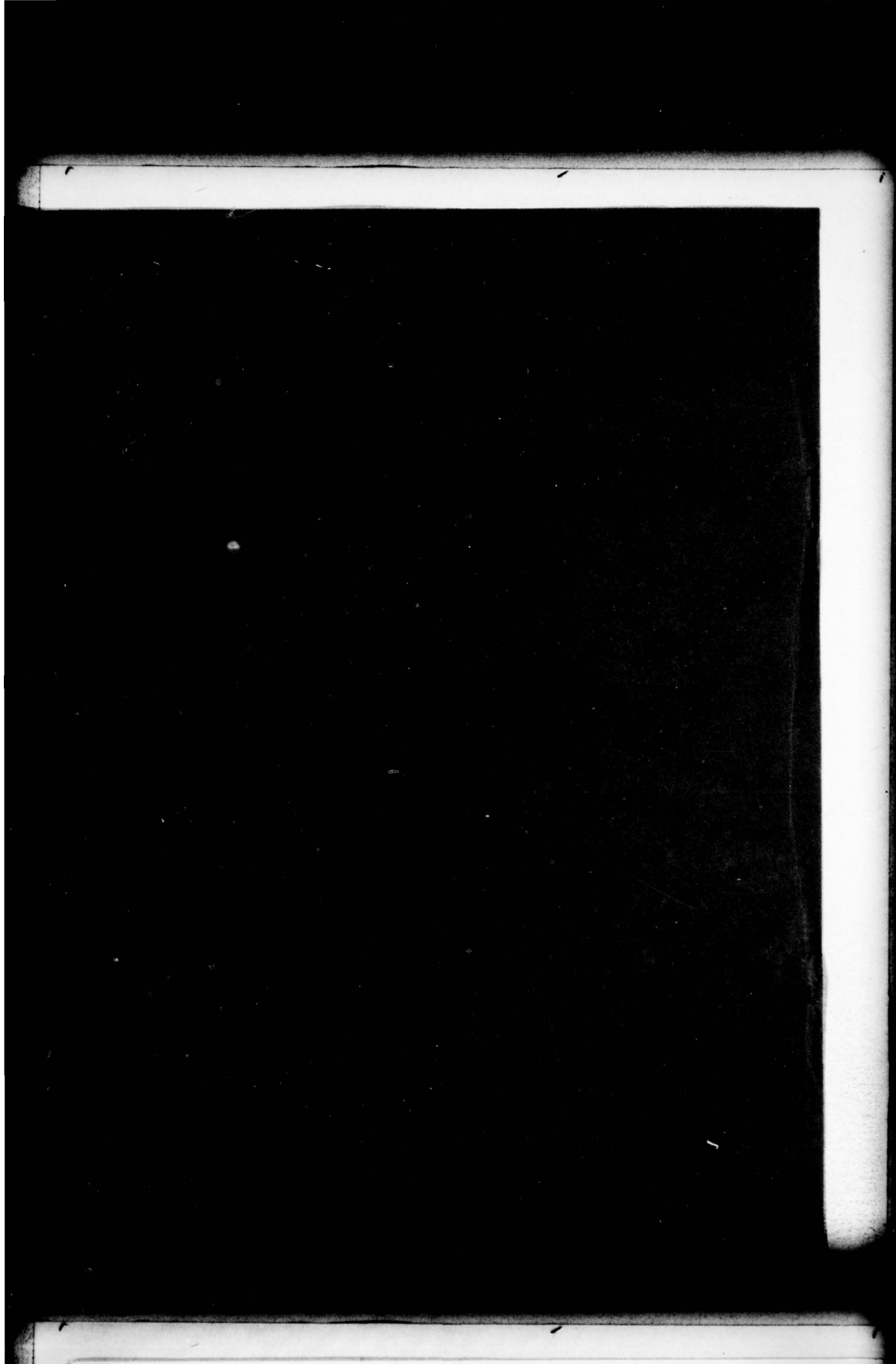


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

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ERRATA SHEET

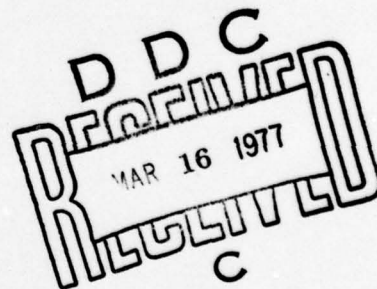
SPECULAR REFLECTION TIMING PREDICTIONS
FOR THE PERIOD
PRECEDING THE 1977 VERNAL EQUINOX

PROJECT REPORT ETS-8

Table I, page 2:

Since the figure numbers were inadvertently omitted from the computer printouts, column three has been changed to page numbers, NOT figure numbers.

Please insert this errata sheet in all copies of the above-designated report.



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MASSACHUSETTS INSTITUTE OF TECHNOLOGY
LINCOLN LABORATORY

SPECULAR REFLECTION TIMING PREDICTIONS
FOR THE PERIOD
PRECEDING THE 1977 VERNAL EQUINOX

A. S. FRIEDMAN
Group 94

PROJECT REPORT ETS-8

26 JANUARY 1977

Approved for public release; distribution unlimited.

LEXINGTON

MASSACHUSETTS

ABSTRACT

With the approach of the vernal equinox, preparations for observing specular reflections from cylindrical synchronous satellites have begun. The purpose of this report is to assemble the results of preliminary computations to make them available for observation scheduling at the GEODSS Experimental Test Site.

With the approach of the vernal equinox, preparations for observing specular reflections from cylindrical synchronous satellites have begun. The purpose of this report is to assemble the results of preliminary computations to make them available for observation scheduling at the GEODSS Experimental Test Site. The reader should consult ETS-3* for details of the mathematics of specular timing.

The orbital elements and axial orientations on which the specular occurrence calculations are based are the best available on 20 January 1977. For data reduction and analysis, current values will be employed. A further assumption is that the symmetry axis of each satellite coincides with its spin axis. Analysis of the departure of observation times from the predicted values will provide information on axial misalignment.

The IDCSP satellites and LES-5 drift in and out of coverage. As no information on their axial position is available, by convention it is placed perpendicular to the orbital plane. For all other satellites, axial orientation is specified.

In 1977 the vernal equinox occurs on 20 March at 17^h43^m UT. As expected, February and March are the prime months for specular observing. Table 1 is an index of the satellites and their time tables.

*A. S. Friedman, "Determination of Specular Reflection From Cylindrical Satellites for Electro-Optical Surveillance and SOI," Project Report ETS-3, Lincoln Laboratory, M.I.T. (8 October 1976).

TABLE 1
INDEX TO SPECULAR TIMING CHARTS

Satellite Number	Satellite Name	Page
2866	LES-5	18
83505	GOES-1	9
83506	IDCSP 24	27
83507	IS II F-3	14
83509	Westar 1	3
83512	IS I-EB	13
83513	IS III F-2	16
83523	ATS-5	12
83533	ATS-3	11
83534	IS III F-6	17
83535	ATS-1	10
83538	IS II F-4	15
83541	IDCSP 23	26
83544	IDCSP 16	25
83546	IDCSP 14	24
83547	IDCSP 13	23
83548	IDCSP 12	22
83549	IDCSP 11	21
83550	IDCSP 10	20
83551	IDCSP 8	19
83560	SMS-2	8
83567	SMS-1	7
83569	Westar 2	4
83592	Comstar 1	5
83598	Comstar 2	6

☒ To the Section
☐ Out Section
☐

A

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 33509. USA SITE= STAL
 DESTA 74 022 A WESTAK - I (SOC 7250)

EPNCH= 1977 6 10:14: 5.9 E= 0.0001994 I= 0.0130
 A= 1.0026417 A= 6.6109 M= 307.9709
 ANODE= 410.6090 ARGPER= 262.2318
 RHOAX= 0.43 MAX= 220.74 DECA= 89.91 MISALGNAX= 0.00
 OFFSET FROM ORB NORMLE= 0.08 LONG FROM ANODE= 270.15

SATELLITE GRAPHIC TIME TABLE
 FROM MAR 1977 THROUGH MAR 1977

	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	1977
1 MAR 60																		2 MAR 61
2 MAR 61																		3 MAR 62
3 MAR 62																		4 MAR 63
4 MAR 63																		5 MAR 64
5 MAR 64																		6 MAR 65
6 MAR 65																		7 MAR 66
7 MAR 66																		8 MAR 67
8 MAR 67																		9 MAR 68
9 MAR 68																		10 MAR 69
10 MAR 69																		11 MAR 70
11 MAR 70																		12 MAR 71
12 MAR 71																		13 MAR 72
13 MAR 72																		14 MAR 73
14 MAR 73																		15 MAR 74
15 MAR 74																		16 MAR 75
16 MAR 75																		17 MAR 76
17 MAR 76																		18 MAR 77
18 MAR 77																		19 MAR 78
19 MAR 78																		20 MAR 79
20 MAR 79																		21 MAR 80
21 MAR 80																		22 MAR 81
22 MAR 81																		23 MAR 82
23 MAR 82																		24 MAR 83
24 MAR 83																		25 MAR 84
25 MAR 84																		26 MAR 85
26 MAR 85																		27 MAR 86
27 MAR 86																		28 MAR 87
28 MAR 87																		29 MAR 88
29 MAR 88																		30 MAR 89
30 MAR 89																		31 MAR 90
31 MAR 90																		1 APR 91

SUNSET/SUNRISE
 TWILIGHT
 *SPECULAR REFLECTION AT SITE
 E=ECLIPSED BY EARTH
 X=ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 33569. USA SITE= STAL
 DESTID 74 075 A WESTAK-II PAYLOAD (SUC 7466)

EPNOME 1976.350 18:34:55.7 E= 0.0002922 T= 0.0486
 N= 1.00274089 A= 6.6106 M= 50.2318
 ANODE= 240.9216 ARGPER= 309.7424

RHOA= 0.94 RAAX= 253.56 DECAF= 84.96 MISALGNAX= 0.00
 OFFSET FROM ORB NORMLE 0.07 LONG FROM ANODE= 58.71

SATELLITE GRAPHIC TIME TABLE
 FROM MAR 1977 THROUGH MAR 1977

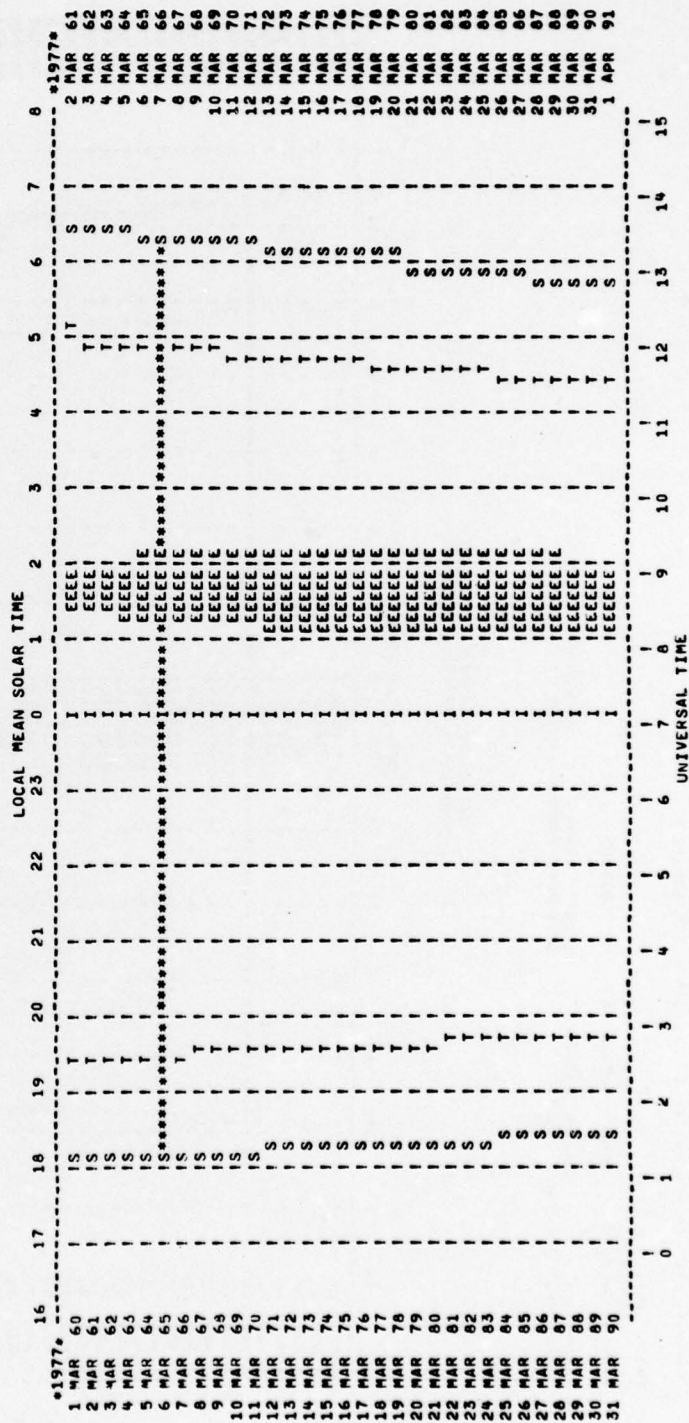
		LOCAL MEAN SOLAR TIME																																			
		16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8																			

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 43592. USA SITE= STAL
 ORBITA 76 042 A COMSTAR I PAYLOAD (ATT/CONSAT)

EPHCH= 1977 6 913742.5
 NZ= 1.00268044 A= 6.6109 E= 0.0004773 T= 0.0074
 ANODE= 248.6777 ARGPH= 16.2747 ME= 217.2144

RHODE= 0.47 MAX= 225.10 DECAE= 89.84 MISALGNAX= 0.00
 OFFSET FROM ORH LORML= 0.16 LONG FROM ANODE= 338.89

SATELLITE GRAPHIC TIME TABLE
 FROM MAR 1977 THROUGH MAR 1977



SUNSET/SUNRISE
 TWILIGHT
 *SPECLAR REFLECTION AT SITE
 E=ECLIPSED BY EARTH
 X=ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 33598. USA
 OFFSTA 76 073 A COMSTAR II PAYLOAD (ATT/CONSAT)

EPOCH = 1977 6 3:51:42.7 I = 0.0343
 A = 6.6108
 ANODE = 64.9058 ARGPER = 277.1700 ME = 86.3203
 RAAX = 0.47 HAAX = 225.10 DECA = 89.84 MISALGNAX = 0.00
 OFFSET FROM ORH NORMLE = 0.17 LONG FROM ANODE = 149.55

SATELLITE GRAPHIC TIME TABLE
 FROM MAR 1977 THROUGH MAR 1977

	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	1977
1 MAR 60																		2 MAR 61
2 MAR 61																		3 MAR 62
3 MAR 62																		4 MAR 63
4 MAR 63																		5 MAR 64
5 MAR 64																		6 MAR 65
6 MAR 65																		7 MAR 66
7 MAR 66																		8 MAR 67
8 MAR 67																		9 MAR 68
9 MAR 68																		10 MAR 69
10 MAR 69																		11 MAR 70
11 MAR 70																		12 MAR 71
12 MAR 71																		13 MAR 72
13 MAR 72																		14 MAR 73
14 MAR 73																		15 MAR 74
15 MAR 74																		16 MAR 75
16 MAR 75																		17 MAR 76
17 MAR 76																		18 MAR 77
18 MAR 77																		19 MAR 78
19 MAR 78																		20 MAR 79
20 MAR 79																		21 MAR 80
21 MAR 80																		22 MAR 81
22 MAR 81																		23 MAR 82
23 MAR 82																		24 MAR 83
24 MAR 83																		25 MAR 84
25 MAR 84																		26 MAR 85
26 MAR 85																		27 MAR 86
27 MAR 86																		28 MAR 87
28 MAR 87																		29 MAR 88
29 MAR 88																		30 MAR 89
30 MAR 89																		31 MAR 90
31 MAR 90																		1 APR 91

S=SUNSET/SUNRISE
 T=TWILIGHT
 *S=SPECULAR REFLECTION AT SITE
 E=ECLIPSED BY EARTH
 X=ALTITUDE LESS THAN 0 DLG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 43567, USA SITER STAL
 DESTTA 74 033 A SYNCHRONOUS METEOROLOGICAL SATELLITE - I (SDC 7298)

EPHCH= 1977 2 8148152.3 L= 0.0004127 I= 2.2862
 N= 1.00269297 A= 6.6108 M= 267.9732
 ANODE= 129.6061 ARGPER= 92.0748
 RMNAX= 0.31 RAAX= 122.20 DECAH= -82.50 MISALGNAX= 0.00
 OFFSET FROM ORH NORMLE= 8.02 LONG FROM ANODE= 156.43

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH MAR 1977

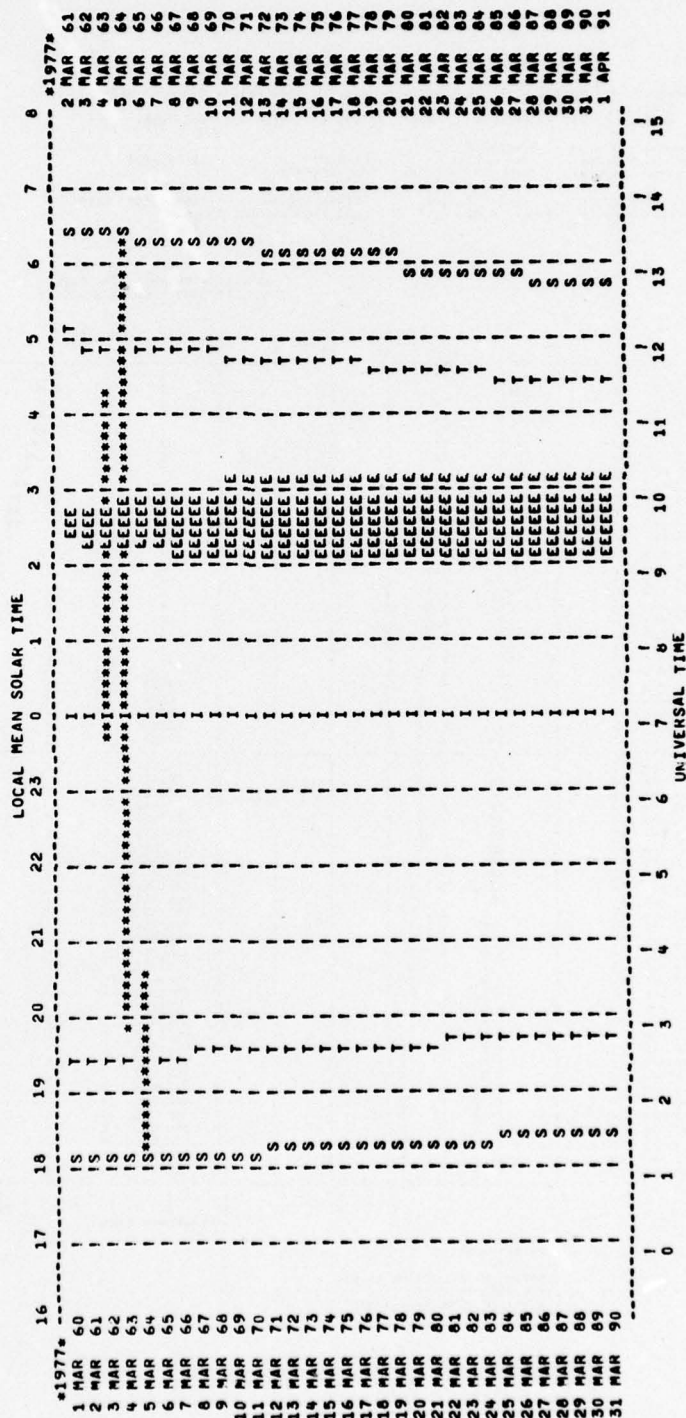
		LOCAL MEAN SOLAR TIME																
		16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8
1977																1977		
1 FEB	32	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	2 FEB 33
2 FEB	33	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	3 FEB 34
3 FEB	34	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	4 FEB 35
4 FEB	35	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	5 FEB 36
5 FEB	36	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	6 FEB 37
6 FEB	37	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	7 FEB 38
7 FEB	38	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	8 FEB 39
8 FEB	39	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	9 FEB 40
9 FEB	40	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	10 FEB 41
10 FEB	41	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	11 FEB 42
11 FEB	42	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	12 FEB 43
12 FEB	43	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	13 FEB 44
13 FEB	44	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	14 FEB 45
14 FEB	45	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	15 FEB 46
15 FEB	46	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	16 FEB 47
16 FEB	47	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	17 FEB 48
17 FEB	48	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	18 FEB 49
18 FEB	49	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	19 FEB 50
19 FEB	50	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	20 FEB 51
20 FEB	51	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	21 FEB 52
21 FEB	52	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	22 FEB 53
22 FEB	53	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	23 FEB 54
23 FEB	54	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	24 FEB 55
24 FEB	55	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	25 FEB 56
25 FEB	56	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	26 FEB 57
26 FEB	57	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	27 FEB 58
27 FEB	58	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	28 FEB 59
28 FEB	59	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	1 MAR 60
1977																1977		
1 MAR	60	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	2 MAR 61
2 MAR	61	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	3 MAR 62
3 MAR	62	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	4 MAR 63
4 MAR	63	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	5 MAR 64
5 MAR	64	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	6 MAR 65
6 MAR	65	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	7 MAR 66
7 MAR	66	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	8 MAR 67
8 MAR	67	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	9 MAR 68
9 MAR	68	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	10 MAR 69
10 MAR	69	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	11 MAR 70
11 MAR	70	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	12 MAR 71
12 MAR	71	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	13 MAR 72
13 MAR	72	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	14 MAR 73
14 MAR	73	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	15 MAR 74
15 MAR	74	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	16 MAR 75
16 MAR	75	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	17 MAR 76
17 MAR	76	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	18 MAR 77
18 MAR	77	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	19 MAR 78
19 MAR	78	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	20 MAR 79
20 MAR	79	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	21 MAR 80
21 MAR	80	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	22 MAR 81
22 MAR	81	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	23 MAR 82
23 MAR	82	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	24 MAR 83
24 MAR	83	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	25 MAR 84
25 MAR	84	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	26 MAR 85
26 MAR	85	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	27 MAR 86
27 MAR	86	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	28 MAR 87
28 MAR	87	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	29 MAR 88
29 MAR	88	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	30 MAR 89
30 MAR	89	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	31 MAR 90
31 MAR	90	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	I	1 APR 91

S=SUNSET/SUNRISE
 T=TWILIGHT
 *S=SPECULAR REFLECTION AT SITE
 *E=ECLIPSE BY EARTH
 *A=ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 85°60. USA SITE = STAL
 UESTTA 75 011 A SYNCHRONOUS METEOROLOGICAL SATELLITE II (SDC7648)

EPNCH= 1977 10 19:50:10.9 E= 0.0465876 T= 0.2036
 N= 1.00265781 A= 6.6110 M= 280.3859
 ANODE= 261.2774 ARGPE= 64.9134
 RHOEA= 0.51 RAX= 148.71 DECA= -89.51 MISALGNAX= 0.00
 OFFSET FROM ORB NORML= 0.68 LONG FROM ANODE= 74.05

SATELLITE GRAPHIC TIME TABLE
 FROM MAR 1977 THROUGH MAR 1977

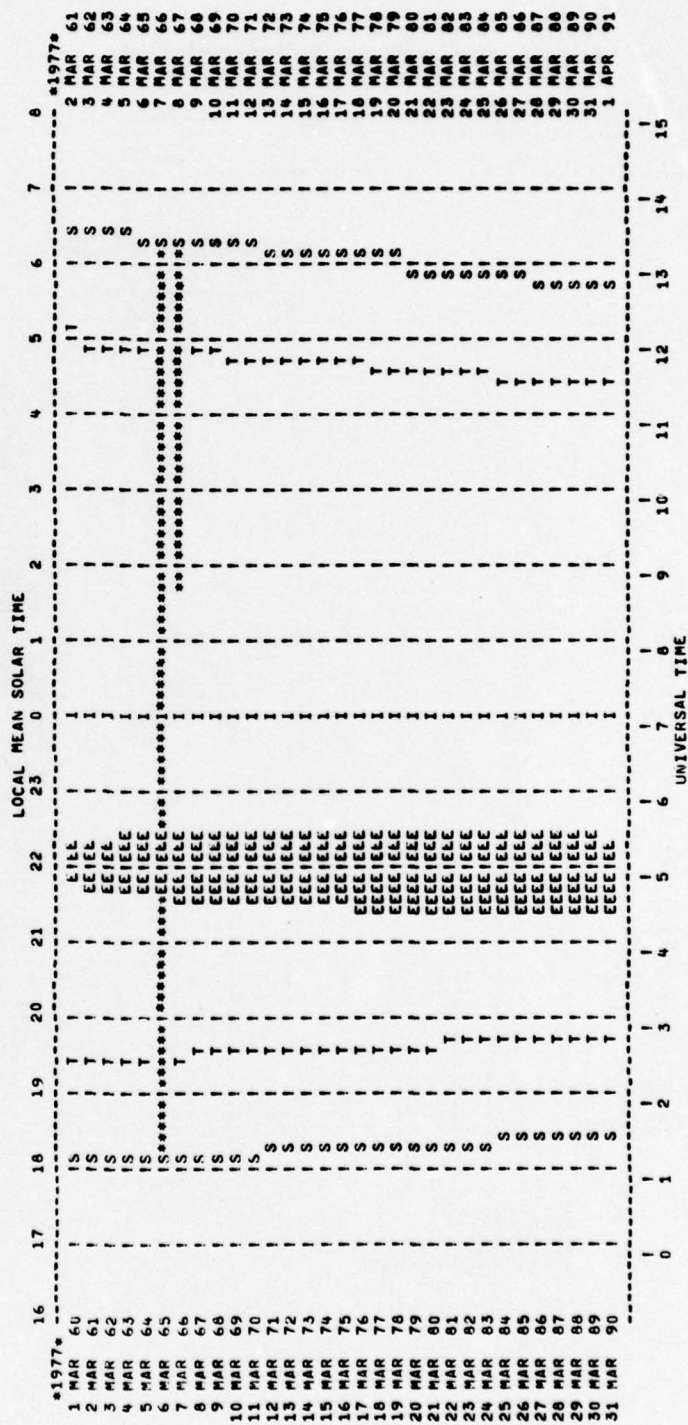



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RMAX= 0.31      RAX= 6.96      DECA= -89.82      MISALGNAX= 0.00
OFFSET FROM ORN NORAL= 0.17      LONG FROM ANODE= 52.38

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SATELLITE GRAPHIC TIME TABLE
FROM MAR 1977 THROUGH MAR 1977



S=SUNSET/SUNRISE

T=TWILIGHT REFLECTION AT SITE
S=SPECULAR BY EARTH
E=ECLIPSED BY EARTH
X=ALTITUDE LESS THAN 0 DEG

IPFCLAR REFLECTION FROM CYLINDRICAL SATELLITE, SPIN AXIS = SYMMETRY AXIS
 43535, USA SITE: BTAL
 JESTTA 66 110 & APPLICATIONS TECHNOLOGY SATELLITE - 1 (SDC 2600)

DATE: 1976 294 11:30124.6 E= 0.0009100 I= 7.7890
 Az 6.6108 M= 189.8745
 UNDEF= 52.6277 ARGPER= 170.1461
 INCL= 0.14 HAAX= 125.20 DECA= -84.40 MISALGN= 0.00
 IPSET FROM ORB NORAL= 2.94 LONG FROM ANODE= 129.21

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH MAR 1977

		LOCAL MEAN SOLAR TIME																	
		16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	
1977	1 FEB 42	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	2 FEB 33
	2 FEB 43	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	3 FEB 34
	3 FEB 44	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	4 FEB 35
	4 FEB 45	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	5 FEB 36
	5 FEB 46	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	6 FEB 37
	6 FEB 47	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	7 FEB 38
	7 FEB 48	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	8 FEB 39
	8 FEB 49	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	9 FEB 40
	9 FEB 50	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	10 FEB 41
	10 FEB 51	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	11 FEB 42
	11 FEB 52	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	12 FEB 43
	12 FEB 53	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	13 FEB 44
	13 FEB 54	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	14 FEB 45
	14 FEB 55	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	15 FEB 46
	15 FEB 56	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	16 FEB 47
	16 FEB 57	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	17 FEB 48
	17 FEB 58	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	18 FEB 49
	18 FEB 59	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	19 FEB 50
	19 FEB 60	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	20 FEB 51
	20 FEB 61	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	21 FEB 52
	21 FEB 62	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	22 FEB 53
	22 FEB 63	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	23 FEB 54
	23 FEB 64	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	24 FEB 55
	24 FEB 65	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	25 FEB 56
	25 FEB 66	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	26 FEB 57
	26 FEB 67	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	27 FEB 58
	27 FEB 68	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	28 FEB 59
	28 FEB 69	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	1 MAR 60
1977	1 MAR 60	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	2 MAR 61
	2 MAR 61	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	3 MAR 62
	3 MAR 62	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	4 MAR 63
	4 MAR 63	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	5 MAR 64
	5 MAR 64	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	6 MAR 65
	6 MAR 65	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	7 MAR 66
	7 MAR 66	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	8 MAR 67
	8 MAR 67	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	9 MAR 68
	9 MAR 68	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	10 MAR 69
	10 MAR 69	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	11 MAR 70
	11 MAR 70	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	12 MAR 71
	12 MAR 71	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	13 MAR 72
	13 MAR 72	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	14 MAR 73
	14 MAR 73	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	15 MAR 74
	15 MAR 74	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	16 MAR 75
	16 MAR 75	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	17 MAR 76
	17 MAR 76	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	18 MAR 77
	18 MAR 77	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	19 MAR 78
	19 MAR 78	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	20 MAR 79
	20 MAR 79	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	21 MAR 80
	21 MAR 80	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	22 MAR 81
	22 MAR 81	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	23 MAR 82
	23 MAR 82	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	24 MAR 83
	24 MAR 83	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	25 MAR 84
	25 MAR 84	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	26 MAR 85
	26 MAR 85	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	27 MAR 86
	27 MAR 86	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	28 MAR 87
	28 MAR 87	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	29 MAR 88
	29 MAR 88	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	30 MAR 89
	30 MAR 89	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	31 MAR 90
	31 MAR 90	I	S	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	1 APR 91

S=SET/SUNRISE
 T=ILIGHT
 *S=SPECULAR REFLECTION AT SITE
 E=ECLIPSED BY EARTH
 X=ALTITUDE LESS THAN 0 DEG

IPFCULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 43553. USA SITE= STAL
 DEF17A 67 111 A APPLICATIONS TECHNOLOGY SATELLITE - 3 (SDC 3829)

POCH= 1977 12 2127130.5 E= 0.0017181 I= 6.3301
 LE 1.00205567 AM 6.6136 M= 299.6602
 MODE= 57.0658 ARGPK= 64.5200
 IN:PP= 0.14 HAAX= 154.30 DECAK= -86.90 MISALGNAX= 0.00
 IPFSET FROM ORB NORML= 3.28 LONG FROM ANODE= 83.16

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH MAR 1977

	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	
1 FEB 72	I	S	I	IT					I						I	T	S	2 FEB 33
2 FEB 33	I	S	I	IT					I						I	T	S	3 FEB 34
3 FEB 34	I	S	I	IT					I						I	T	S	4 FEB 35
4 FEB 35	I	S	I	IT					I						I	T	S	5 FEB 36
5 FEB 36	I	S	I	IT					I						I	T	S	6 FEB 37
6 FEB 37	I	S	I	IT					I						I	T	S	7 FEB 38
7 FEB 38	I	S	I	IT					I						I	T	S	8 FEB 39
8 FEB 39	I	S	I	IT					EE I						I	T	S	9 FEB 40
9 FEB 40	I	S	I	IT					EE I						I	T	S	10 FEB 41
10 FEB 41	I	S	I	IT					EEEEI						I	T	S	11 FEB 42
11 FEB 42	I	S	I	IT					EEEEI						I	T	S	12 FEB 43
12 FEB 43	I	S	I	IT					EEEEI						I	T	S	13 FEB 44
13 FEB 44	I	S	I	IT					EEEEI						I	T	S	14 FEB 45
14 FEB 45	I	S	I	IT					EEEEI						I	T	S	15 FEB 46
15 FEB 46	I	S	I	IT					EEEEI						I	T	S	16 FEB 47
16 FEB 47	I	S	I	IT					EEEEI						I	T	S	17 FEB 48
17 FEB 48	I	S	I	IT					EEEEI						I	T	S	18 FEB 49
18 FEB 49	I	S	I	IT					EEEEI						I	T	S	19 FEB 50
19 FEB 50	I	S	I	IT					EEEEI						I	T	S	20 FEB 51
20 FEB 51	I	S	I	IT					EEEEI						I	T	S	21 FEB 52
21 FEB 52	I	S	I	IT					EEEEI						I	T	S	22 FEB 53
22 FEB 53	I	S	I	IT					EEEEI						I	T	S	23 FEB 54
23 FEB 54	I	S	I	IT					EEEEI						I	T	S	24 FEB 55
24 FEB 55	I	S	I	IT					EEEEI						I	T	S	25 FEB 56
25 FEB 56	I	S	I	IT					EEEEI						I	T	S	26 FEB 57
26 FEB 57	I	S	I	IT					EEEEI						I	T	S	27 FEB 58
27 FEB 58	I	S	I	IT					EEEEI						I	T	S	28 FEB 59
28 FEB 59	I	S	I	IT					EEEEI						I	T	S	1 MAR 60
1 MAR 60	I	S	I	IT					EEEEI						I	T	S	2 MAR 61
2 MAR 61	I	S	I	IT					EEEEI						I	T	S	3 MAR 62
3 MAR 62	I	S	I	IT					EEEEI						I	T	S	4 MAR 63
4 MAR 63	I	S	I	IT					EEEEI						I	T	S	5 MAR 64
5 MAR 64	I	S	I	IT					EEEEI						I	T	S	6 MAR 65
6 MAR 65	I	S	I	IT					EEEEI						I	T	S	7 MAR 66
7 MAR 66	I	S	I	IT					EEEEI						I	T	S	8 MAR 67
8 MAR 67	I	S	I	IT					EEEEI						I	T	S	9 MAR 68
9 MAR 68	I	S	I	IT					EEEEI						I	T	S	10 MAR 69
10 MAR 69	I	S	I	IT					EEEEI						I	T	S	11 MAR 70
11 MAR 70	I	S	I	IT					EEEEI						I	T	S	12 MAR 71
12 MAR 71	I	S	I	IT					EEEEI						I	T	S	13 MAR 72
13 MAR 72	I	S	I	IT					EEEEI						I	T	S	14 MAR 73
14 MAR 73	I	S	I	IT					EEEEI						I	T	S	15 MAR 74
15 MAR 74	I	S	I	IT					EEEEI						I	T	S	16 MAR 75
16 MAR 75	I	S	I	IT					EEEEI						I	T	S	17 MAR 76
17 MAR 76	I	S	I	IT					EEEEI						I	T	S	18 MAR 77
18 MAR 77	I	S	I	IT					EEEEI						I	T	S	19 MAR 78
19 MAR 78	I	S	I	IT					EEEEI						I	T	S	20 MAR 79
20 MAR 79	I	S	I	IT					EEEEI						I	T	S	21 MAR 80
21 MAR 80	I	S	I	IT					EEEEI						I	T	S	22 MAR 81
22 MAR 81	I	S	I	IT					EEEEI						I	T	S	23 MAR 82
23 MAR 82	I	S	I	IT					EEEEI						I	T	S	24 MAR 83
24 MAR 83	I	S	I	IT					EEEEI						I	T	S	25 MAR 84
25 MAR 84	I	S	I	IT					EEEEI						I	T	S	26 MAR 85
26 MAR 85	I	S	I	IT					EEEEI						I	T	S	27 MAR 86
27 MAR 86	I	S	I	IT					EEEEI						I	T	S	28 MAR 87
28 MAR 87	I	S	I	IT					EEEEI						I	T	S	29 MAR 88
29 MAR 88	I	S	I	IT					EEEEI						I	T	S	30 MAR 89
30 MAR 89	I	S	I	IT					EEEEI						I	T	S	31 MAR 90
31 MAR 90	I	S	I	IT					EEEEI						I	T	S	1 APR 91

S=SUNSET/SUNRISE
 T=TWILIGHT
 *S=SPECULAR REFLECTION AT SITE
 E=ECLIPSED BY EARTH
 *A=ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 ASD23. USA SITE# STAL
 DESTTA 69 069 A APPLICATIONS TECHNOLOGY SATELLITE - S (SDC 4068)

EPNCH= 1976 345 6:13:41.5 E= 0.0013508 I= 3.6766
 N= 1.00272675 Az= 6.6107 M= 162.2092
 ANODE= 66.9449 ARGPEH= 177.7979
 H=0.00118 HAAH= 26.20 DECAY= 66.20 MISALONAX= 0.00
 OFFSET FROM ORB NURML= 3.23 LONG FROM ANODE= 23.61

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH MAR 1977

		LOCAL MEAN SOLAR TIME															
		16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7
		1977															1977
1 FEB	32	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
2 FEB	33	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
3 FEB	34	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
4 FEB	35	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
5 FEB	36	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
6 FEB	37	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
7 FEB	38	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
8 FEB	39	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
9 FEB	40	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
10 FEB	41	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
11 FEB	42	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
12 FEB	43	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
13 FEB	44	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
14 FEB	45	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
15 FEB	46	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
16 FEB	47	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
17 FEB	48	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
18 FEB	49	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
19 FEB	50	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
20 FEB	51	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
21 FEB	52	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
22 FEB	53	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
23 FEB	54	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
24 FEB	55	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
25 FEB	56	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
26 FEB	57	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
27 FEB	58	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
28 FEB	59	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
1 MAR	60	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
2 MAR	61	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
3 MAR	62	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
4 MAR	63	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
5 MAR	64	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
6 MAR	65	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
7 MAR	66	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
8 MAR	67	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
9 MAR	68	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
10 MAR	69	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
11 MAR	70	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
12 MAR	71	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
13 MAR	72	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
14 MAR	73	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
15 MAR	74	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
16 MAR	75	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
17 MAR	76	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
18 MAR	77	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
19 MAR	78	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
20 MAR	79	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
21 MAR	80	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
22 MAR	81	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
23 MAR	82	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
24 MAR	83	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
25 MAR	84	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
26 MAR	85	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
27 MAR	86	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
28 MAR	87	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
29 MAR	88	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
30 MAR	89	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
31 MAR	90	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S
1 APR	91	I	S	I	T	I	I	I	I	I	I	I	I	I	I	I	S

S=SUNSET/SUNRISE
 T=TWILIGHT
 *S=SPECULAR REFLECTION AT SITE
 L=ECLIPSED BY EARTH
 X=ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE: SPIN AXIS = SYMMETRY AXIS
 A3512, USA SITEM STAL
 DESTTA 65 028 A INTELSAT I-EB EARLY BIRD (SDC 1317)

EPNCH= 1976 344 01 01 0.0 E= 0.0003107 I= 10.1006
 NZ= 1.00179139 AZ= 6.6146 M= 135.0002
 ANONE= 46,2015 ARGPE= 130,2428
 HMIN= 0.05 HMAX= 190.21 DECA= -84.98 MISALGN= 0.00
 OFFSET FROM ORR NORM= 0.29 LONG FROM ANODE= 60.96

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH MAR 1977

		LOCAL MEAN SOLAR TIME																
		16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8
1977	1 FEB 34																	1977
	2 FEB 35																	2 FEB 35
	3 FEB 36																	3 FEB 36
	4 FEB 37																	4 FEB 37
	5 FEB 38																	5 FEB 38
	6 FEB 39																	6 FEB 39
	7 FEB 40																	7 FEB 40
	8 FEB 41																	8 FEB 41
	9 FEB 42																	9 FEB 42
	10 FEB 43																	10 FEB 43
	11 FEB 44																	11 FEB 44
	12 FEB 45																	12 FEB 45
	13 FEB 46																	13 FEB 46
	14 FEB 47																	14 FEB 47
	15 FEB 48																	15 FEB 48
	16 FEB 49																	16 FEB 49
	17 FEB 50																	17 FEB 50
	18 FEB 51																	18 FEB 51
	19 FEB 52																	19 FEB 52
	20 FEB 53																	20 FEB 53
	21 FEB 54																	21 FEB 54
	22 FEB 55																	22 FEB 55
	23 FEB 56																	23 FEB 56
	24 FEB 57																	24 FEB 57
	25 FEB 58																	25 FEB 58
	26 FEB 59																	26 FEB 59
	27 FEB 60																	27 FEB 60
	28 FEB 61																	28 FEB 61
	29 FEB 62																	29 FEB 62
	30 FEB 63																	30 FEB 63
	31 FEB 64																	31 FEB 64
1977	1 MAR 65																	1 MAR 65
	2 MAR 66																	2 MAR 66
	3 MAR 67																	3 MAR 67
	4 MAR 68																	4 MAR 68
	5 MAR 69																	5 MAR 69
	6 MAR 70																	6 MAR 70
	7 MAR 71																	7 MAR 71
	8 MAR 72																	8 MAR 72
	9 MAR 73																	9 MAR 73
	10 MAR 74																	10 MAR 74
	11 MAR 75																	11 MAR 75
	12 MAR 76																	12 MAR 76
	13 MAR 77																	13 MAR 77
	14 MAR 78																	14 MAR 78
	15 MAR 79																	15 MAR 79
	16 MAR 80																	16 MAR 80
	17 MAR 81																	17 MAR 81
	18 MAR 82																	18 MAR 82
	19 MAR 83																	19 MAR 83
	20 MAR 84																	20 MAR 84
	21 MAR 85																	21 MAR 85
	22 MAR 86																	22 MAR 86
	23 MAR 87																	23 MAR 87
	24 MAR 88																	24 MAR 88
	25 MAR 89																	25 MAR 89
	26 MAR 90																	26 MAR 90
	27 MAR 91																	27 MAR 91
	28 MAR 92																	28 MAR 92
	29 MAR 93																	29 MAR 93
	30 MAR 94																	30 MAR 94
	31 MAR 95																	31 MAR 95
	1 APR 96																	1 APR 96

S=SUNSET/SUNRISE
 T=TILIGHT
 *S=SPECULAR REFLECTION AT SITE
 E=ECLIPSED BY EARTH
 A=ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE: SPIN AXIS = SYMMETRY AXIS
 43507 USA SITE= BTAL
 DESITA 67 026 A INTELSAT 11 F = 3 (SOC 2717)

EPNCH= 1976 344 01 01 0.0 Lx 0.0016574 Lz 7.0400
 Az 1.00501526 AR= 6.6059 Mx 531.6946
 ANCHER 51.0073 ARGPER= 295.5469
 HNSAR= 0.07 HAPKE= 103.27 DECAKE= -88.84 MISALGNAX= 0.00
 OFSET1 FROM ORH NORML= 5.97 LONG FROM ANODE= 90.79

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH MAR 1977

		LOCAL MEAN SOLAR TIME																	
		16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	
1977																			1977
1 FEB 32		S	I	T						I					I	T		ST	2 FEB 33
2 FEB 33		S	I	T						I					I	T		ST	3 FEB 34
3 FEB 34		S	I	T						I					I	T		ST	4 FEB 35
4 FEB 35		S	I	T						I					I	T		ST	5 FEB 36
5 FEB 36		S	I	T						I					I	T		ST	6 FEB 37
6 FEB 37		S	I	T						I					I	T		ST	7 FEB 38
7 FEB 38		S	I	T						I					I	T		ST	8 FEB 39
8 FEB 39		S	I	T						I					I	T		ST	9 FEB 40
9 FEB 40		S	I	T						I					I	T		ST	10 FEB 41
10 FEB 41		S	I	T						I					I	T		ST	11 FEB 42
11 FEB 42		S	I	T						I					I	T		ST	12 FEB 43
12 FEB 43		S	I	T						I					I	T		ST	13 FEB 44
13 FEB 44		S	I	T						I					I	T		ST	14 FEB 45
14 FEB 45		S	I	T						I					I	T		ST	15 FEB 46
15 FEB 46		S	I	T						I					I	T		ST	16 FEB 47
16 FEB 47		S	I	T						I					I	T		ST	17 FEB 48
17 FEB 48		S	I	T						I					I	T		ST	18 FEB 49
18 FEB 49		S	I	T						I					I	T		ST	19 FEB 50
19 FEB 50		S	I	T						I					I	T		ST	20 FEB 51
20 FEB 51		S	I	T						I					I	T		ST	21 FEB 52
21 FEB 52		S	I	T						I					I	T		ST	22 FEB 53
22 FEB 53		S	I	T						I					I	T		ST	23 FEB 54
23 FEB 54		S	I	T						I					I	T		ST	24 FEB 55
24 FEB 55		S	I	T						I					I	T		ST	25 FEB 56
25 FEB 56		S	I	T						I					I	T		ST	26 FEB 57
26 FEB 57		S	I	T						I					I	T		ST	27 FEB 58
27 FEB 58		S	I	T						I					I	T		ST	28 FEB 59
28 FEB 59		S	I	T						I					I	T		ST	1 MAR 60
1977																			1977
1 MAR 60		S	I	T						I					I	T		ST	2 MAR 61
2 MAR 61		S	I	T						I					I	T		ST	3 MAR 62
3 MAR 62		S	I	T						I					I	T		ST	4 MAR 63
4 MAR 63		S	I	T						I					I	T		ST	5 MAR 64
5 MAR 64		S	I	T						I					I	T		ST	6 MAR 65
6 MAR 65		S	I	T						I					I	T		ST	7 MAR 66
7 MAR 66		S	I	T						I					I	T		ST	8 MAR 67
8 MAR 67		S	I	T						I					I	T		ST	9 MAR 68
9 MAR 68		S	I	T						I					I	T		ST	10 MAR 69
10 MAR 69		S	I	T						I					I	T		ST	11 MAR 70
11 MAR 70		S	I	T						I					I	T		ST	12 MAR 71
12 MAR 71		S	I	T						I					I	T		ST	13 MAR 72
13 MAR 72		S	I	T						I					I	T		ST	14 MAR 73
14 MAR 73		S	I	T						I					I	T		ST	15 MAR 74
15 MAR 74		S	I	T						I					I	T		ST	16 MAR 75
16 MAR 75		S	I	T						I					I	T		ST	17 MAR 76
17 MAR 76		S	I	T						I					I	T		ST	18 MAR 77
18 MAR 77		S	I	T						I					I	T		ST	19 MAR 78
19 MAR 78		S	I	T						I					I	T		ST	20 MAR 79
20 MAR 79		S	I	T						I					I	T		ST	21 MAR 80
21 MAR 80		S	I	T						I					I	T		ST	22 MAR 81
22 MAR 81		S	I	T						I					I	T		ST	23 MAR 82
23 MAR 82		S	I	T						I					I	T		ST	24 MAR 83
24 MAR 83		S	I	T						I					I	T		ST	25 MAR 84
25 MAR 84		S	I	T						I					I	T		ST	26 MAR 85
26 MAR 85		S	I	T						I					I	T		ST	27 MAR 86
27 MAR 86		S	I	T						I					I	T		ST	28 MAR 87
28 MAR 87		S	I	T						I					I	T		ST	29 MAR 88
29 MAR 88		S	I	T						I					I	T		ST	30 MAR 89
30 MAR 89		S	I	T						I					I	T		ST	31 MAR 90
31 MAR 90		S	I	T						I					I	T		ST	1 APR 91

S=SET/SUNRISE
 T=TWILIGHT
 *S=SPECULAR REFLECTION AT SITE
 *E=ECLIPSED BY LANTH
 *A=ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 03530, USA SITE# STAL
 NESTTA 67 094 A INTELSAT II F - 4 (SOC 2949)

EPACH= 1976 329 01 01 0.0
 NS 1.06189957 AS 6.6143 E= 0.0002886 I= 7.1889
 ANODE= 55.2918 ARGPER= 187.7616 R= 153.6489
 RH= 42 A.07 HAAX= 154.27 DECA= -88.15 HISALONAX= 0.00
 OFFSET FROM ORB NORMLE 5.28 LONG FROM ANODE= 86.86

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH MAR 1977

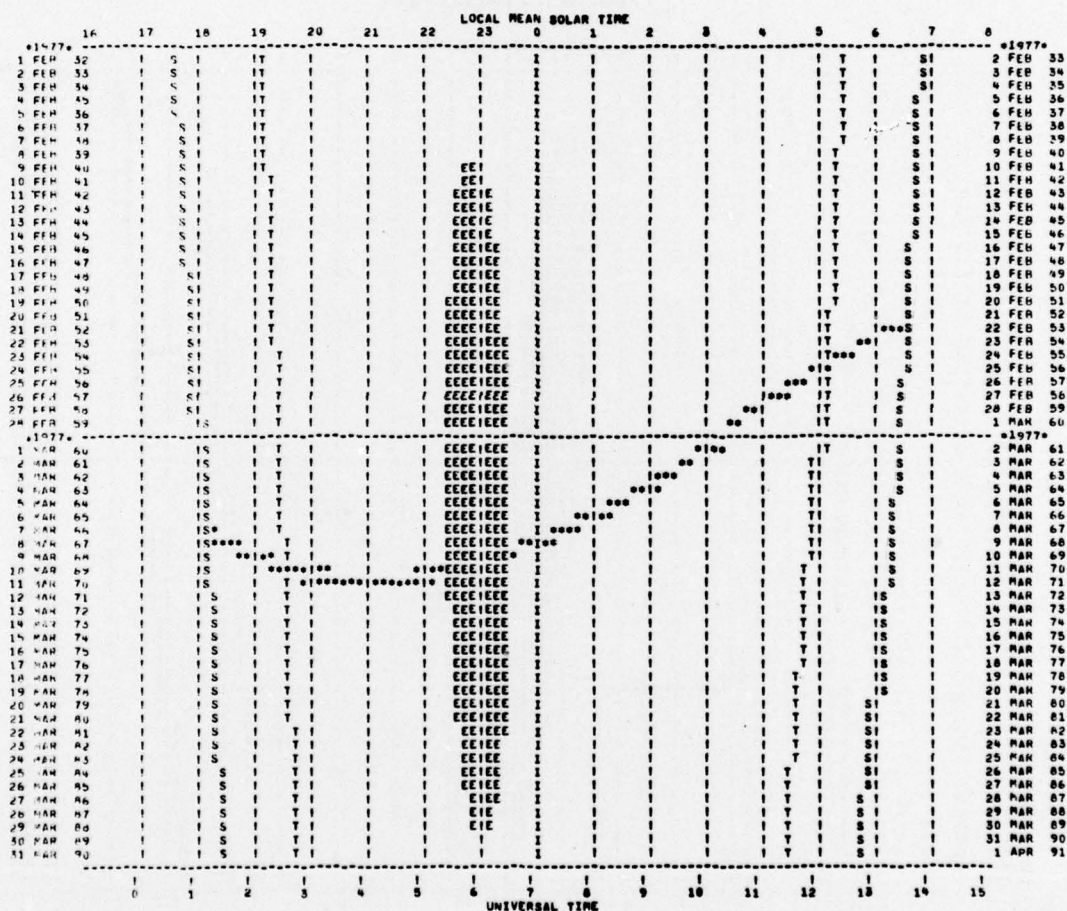
J	LOCAL MEAN SOLAR TIME																J
16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	
1977																	*1977*
1 FEB 32		S	I	IT					I	I				I	T	SI	2 FEB 33
2 FEB 33		S	I	IT					I	I				I	T	SI	3 FEB 34
3 FEB 34		S	I	IT					I	I				I	T	SI	4 FEB 35
4 FEB 35		S	I	IT					I	I				I	T	SI	5 FEB 36
5 FEB 36		S	I	IT					EIE	I				I	T	SI	6 FEB 37
6 FEB 37		S	I	IT					EIE	I				I	T	SI	7 FEB 38
7 FEB 38		S	I	IT					EIE	I				I	T	SI	8 FEB 39
8 FEB 39		S	I	IT					EIE	I				I	T	SI	9 FEB 40
9 FEB 40		S	I	IT					EIE	I				I	T	SI	10 FEB 41
10 FEB 41		S	I	T					EIE	I				I	T	SI	11 FEB 42
11 FEB 42		S	I	T					EIE	I				I	T	SI	12 FEB 43
12 FEB 43		S	I	T					EIE	I				I	T	SI	13 FEB 44
13 FEB 44		S	I	T					EIE	I				I	T	SI	14 FEB 45
14 FEB 45		S	I	T					EIE	I				I	T	SI	15 FEB 46
15 FEB 46		S	I	T					EIE	I				I	T	SI	16 FEB 47
16 FEB 47		S	I	T					EIE	I				I	T	SI	17 FEB 48
17 FEB 48		S	I	T					EIE	I				I	T	SI	18 FEB 49
18 FEB 49		S	I	T					EIE	I				I	T	SI	19 FEB 50
19 FEB 50		S	I	T					EIE	I				I	T	SI	20 FEB 51
20 FEB 51		S	I	T					EIE	I				I	T	SI	21 FEB 52
21 FEB 52		S	I	T					EIE	I				I	T	SI	22 FEB 53
22 FEB 53		S	I	T					EIE	I				I	T	SI	23 FEB 54
23 FEB 54		S	I	T					EIE	I				I	T	SI	24 FEB 55
24 FEB 55		S	I	T					EIE	I				I	T	SI	25 FEB 56
25 FEB 56		S	I	T					EIE	I				I	T	SI	26 FEB 57
26 FEB 57		S	I	T					EIE	I				I	T	SI	27 FEB 58
27 FEB 58		S	I	T					EIE	I				I	T	SI	28 FEB 59
28 FEB 59		S	I	T					EIE	I				I	T	SI	1 MAR 60
1977																	*1977*
1 MAR 60		S	I	T					EIE	I				I	T	SI	2 MAR 61
2 MAR 61		S	I	T					EIE	I				I	T	SI	3 MAR 62
3 MAR 62		S	I	T					EIE	I				I	T	SI	4 MAR 63
4 MAR 63		S	I	T					EIE	I				I	T	SI	5 MAR 64
5 MAR 64		S	I	T					EIE	I				I	T	SI	6 MAR 65
6 MAR 65		S	I	T					EIE	I				I	T	SI	7 MAR 66
7 MAR 66		S	I	T					EIE	I				I	T	SI	8 MAR 67
8 MAR 67		S	I	T					EIE	I				I	T	SI	9 MAR 68
9 MAR 68		S	I	T					EIE	I				I	T	SI	10 MAR 69
10 MAR 69		S	I	T					EIE	I				I	T	SI	11 MAR 70
11 MAR 70		S	I	T					EIE	I				I	T	SI	12 MAR 71
12 MAR 71		S	I	T					EIE	I				I	T	SI	13 MAR 72
13 MAR 72		S	I	T					EIE	I				I	T	SI	14 MAR 73
14 MAR 73		S	I	T					EIE	I				I	T	SI	15 MAR 74
15 MAR 74		S	I	T					EIE	I				I	T	SI	16 MAR 75
16 MAR 75		S	I	T					EIE	I				I	T	SI	17 MAR 76
17 MAR 76		S	I	T					EIE	I				I	T	SI	18 MAR 77
18 MAR 77		S	I	T					EIE	I				I	T	SI	19 MAR 78
19 MAR 78		S	I	T					EIE	I				I	T	SI	20 MAR 79
20 MAR 79		S	I	T					EIE	I				I	T	SI	21 MAR 80
21 MAR 80		S	I	T					EIE	I				I	T	SI	22 MAR 81
22 MAR 81		S	I	T					EIE	I				I	T	SI	23 MAR 82
23 MAR 82		S	I	T					EIE	I				I	T	SI	24 MAR 83
24 MAR 83		S	I	T					EIE	I				I	T	SI	25 MAR 84
25 MAR 84		S	I	T					EIE	I				I	T	SI	26 MAR 85
26 MAR 85		S	I	T					EIE	I				I	T	SI	27 MAR 86
27 MAR 86		S	I	T					EIE	I				I	T	SI	28 MAR 87
28 MAR 87		S	I	T					EIE	I				I	T	SI	29 MAR 88
29 MAR 88		S	I	T					EIE	I				I	T	SI	30 MAR 89
30 MAR 89		S	I	T					EIE	I				I	T	SI	31 MAR 90
31 MAR 90		S	I	T					EIE	I				I	T	SI	1 APR 91
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	UNIVERSAL TIME																

SUNSET/SUNRISE
 TWILIGHT
 *SPECCULAR REFLECTION AT SITE
 ECLIPSED BY EARTH
 ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE, SPIN AXIS = SYMMETRY AXIS
 45513, USA SITE: STAL
 NSTTA 60 116 A INTELSAT III F-2 PAYLOAD (SDC 3628)

EPICHR 1976 317 5145140.5 E= 0.0007979 I= 6.0000
 NR 1.00241088 AR 6.6121 NR 240.2120
 ANODE= 61.7210 ARGPER= 119.8603
 RHO= 0.10 RAAX= 162.66 DECAV= -87.54 MISALNAX= 0.00
 OFFSET FROM ORH NORMLE 3.66 LONG FROM ANODE= 82.55

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH MAR 1977



SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 85534, USA SITE= STAL
 DESTTA 70 005 A INTLSAT III F - 6 (SDC 4297)

FOCUS 1974 344 01 01 0.0 E= 0.0013929 I= 4.8706
 VE 1.00234984 AZ 6.6122 R= 175.2242
 ANODE= 61.9031 ARGPER= 41.0313
 RMSE= 0.10 RAAX= 161.04 DECA= -86.50 MISALGN= 0.00
 OFFSET FROM ORN NORM= 1.52 LONG FROM ANODE= 68.56

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH MAR 1977

	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	
1977																		*1977*
1 FEB 32		S	I	T					I					I	T		S	2 FEB 33
2 FEB 33		S	I	T					I					I	T		S	3 FEB 34
3 FEB 34		S	I	T					I					I	T		S	4 FEB 35
4 FEB 35		S	I	T					I					I	T		S	5 FEB 36
5 FEB 36		S	I	T					I					I	T		S	6 FEB 37
6 FEB 37		S	I	T					I					I	T		S	7 FEB 38
7 FEB 38		S	I	T					I					I	T		S	8 FEB 39
8 FEB 39		S	I	T					I					I	T		S	9 FEB 40
9 FEB 40		S	I	T					I					I	T		S	10 FEB 41
10 FEB 41		S	I	T					I					I	T		S	11 FEB 42
11 FEB 42		S	I	T					I					I	T		S	12 FEB 43
12 FEB 43		S	I	T					I					I	T		S	13 FEB 44
13 FEB 44		S	I	T					I					I	T		S	14 FEB 45
14 FEB 45		S	I	T					I					I	T		S	15 FEB 46
15 FEB 46		S	I	T					I					I	T		S	16 FEB 47
16 FEB 47		S	I	T					I					I	T		S	17 FEB 48
17 FEB 48		S	I	T					I					I	T		S	18 FEB 49
18 FEB 49		S	I	T					I					I	T		S	19 FEB 50
19 FEB 50		S	I	T					I					I	T		S	20 FEB 51
20 FEB 51		S	I	T					I					I	T		S	21 FEB 52
21 FEB 52		S	I	T					I					I	T		S	22 FEB 53
22 FEB 53		S	I	T					I					I	T		S	23 FEB 54
23 FEB 54		S	I	T					I					I	T		S	24 FEB 55
24 FEB 55		S	I	T					I					I	T		S	25 FEB 56
25 FEB 56		S	I	T					I					I	T		S	26 FEB 57
26 FEB 57		S	I	T					I					I	T		S	27 FEB 58
27 FEB 58		S	I	T					I					I	T		S	28 FEB 59
28 FEB 59		S	I	T					I					I	T		S	1 MAR 60
1977																		*1977*
1 MAR 61		S	I	T					I					I	T		S	2 MAR 61
2 MAR 62		S	I	T					I					I	T		S	3 MAR 62
3 MAR 63		S	I	T					I					I	T		S	4 MAR 63
4 MAR 64		S	I	T					I					I	T		S	5 MAR 64
5 MAR 65		S	I	T					I					I	T		S	6 MAR 65
6 MAR 66		S	I	T					I					I	T		S	7 MAR 66
7 MAR 67		S	I	T					I					I	T		S	8 MAR 67
8 MAR 68		S	I	T					I					I	T		S	9 MAR 68
9 MAR 69		S	I	T					I					I	T		S	10 MAR 69
10 MAR 70		S	I	T					I					I	T		S	11 MAR 70
11 MAR 71		S	I	T					I					I	T		S	12 MAR 71
12 MAR 72		S	I	T					I					I	T		S	13 MAR 72
13 MAR 73		S	I	T					I					I	T		S	14 MAR 73
14 MAR 74		S	I	T					I					I	T		S	15 MAR 74
15 MAR 75		S	I	T					I					I	T		S	16 MAR 75
16 MAR 76		S	I	T					I					I	T		S	17 MAR 76
17 MAR 77		S	I	T					I					I	T		S	18 MAR 77
18 MAR 78		S	I	T					I					I	T		S	19 MAR 78
19 MAR 79		S	I	T					I					I	T		S	20 MAR 79
20 MAR 80		S	I	T					I					I	T		S	21 MAR 80
21 MAR 81		S	I	T					I					I	T		S	22 MAR 81
22 MAR 82		S	I	T					I					I	T		S	23 MAR 82
23 MAR 83		S	I	T					I					I	T		S	24 MAR 83
24 MAR 84		S	I	T					I					I	T		S	25 MAR 84
25 MAR 85		S	I	T					I					I	T		S	26 MAR 85
26 MAR 86		S	I	T					I					I	T		S	27 MAR 86
27 MAR 87		S	I	T					I					I	T		S	28 MAR 87
28 MAR 88		S	I	T					I					I	T		S	29 MAR 88
29 MAR 89		S	I	T					I					I	T		S	30 MAR 89
30 MAR 90		S	I	T					I					I	T		S	31 MAR 90
31 MAR 91		S	I	T					I					I	T		S	1 APR 91

S=SET/SUNRISE
 T=TWILIGHT
 *S=SPECULAR REFLECTION AT SITE
 E=ECLIPSED BY EARTH
 X=ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 2866 USA SITE# 28AL
 OBJECT 67 086 LINCOLN EXPERIMENTAL SATELLITE-3 (SDC 2866)

EPOCH= 1977 3 01 01 0.0 E= 0.0048382 I= 2.9169
 NA= 1.0041385A A= 6.2572 M= 51.5704
 ANODE= 127.6491 ARGPER= 250.7868
 HRAJ= 1.00 HAPX= 237.90 DECA= 87.08 MISALIGN= 0.00
 OFFSET EQUX ORH NORPL= 0.00 LONG FROM ANODE= 0.00

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH MAR 1977

		LOCAL MEAN SOLAR TIME																		
		16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8		
1977																			1977	
1 FEB	42																	2 FEB 43		
2 FEB	43																	3 FEB 44		
3 FEB	44																	4 FEB 45		
4 FEB	45																	5 FEB 46		
5 FEB	46																	6 FEB 47		
6 FEB	47																	7 FEB 48		
7 FEB	48																	8 FEB 49		
8 FEB	49																	9 FEB 50		
9 FEB	50																	10 FEB 51		
10 FEB	51																	11 FEB 52		
11 FEB	52																	12 FEB 53		
12 FEB	53																	13 FEB 54		
13 FEB	54																	14 FEB 55		
14 FEB	55																	15 FEB 56		
15 FEB	56																	16 FEB 57		
16 FEB	57																	17 FEB 58		
17 FEB	58																	18 FEB 59		
18 FEB	59																	19 FEB 60		
19 FEB	60																	20 FEB 61		
20 FEB	61																	21 FEB 62		
21 FEB	62																	22 FEB 63		
22 FEB	63																	23 FEB 64		
23 FEB	64																	24 FEB 65		
24 FEB	65																	25 FEB 66		
25 FEB	66																	26 FEB 67		
26 FEB	67																	27 FEB 68		
27 FEB	68																	28 FEB 69		
28 FEB	69																	1 MAR 60		
1977																			1977	
1 MAR	60																	2 MAR 61		
2 MAR	61																	3 MAR 62		
3 MAR	62																	4 MAR 63		
4 MAR	63																	5 MAR 64		
5 MAR	64																	6 MAR 65		
6 MAR	65																	7 MAR 66		
7 MAR	66																	8 MAR 67		
8 MAR	67																	9 MAR 68		
9 MAR	68																	10 MAR 69		
10 MAR	69																	11 MAR 70		
11 MAR	70																	12 MAR 71		
12 MAR	71																	13 MAR 72		
13 MAR	72																	14 MAR 73		
14 MAR	73																	15 MAR 74		
15 MAR	74																	16 MAR 75		
16 MAR	75																	17 MAR 76		
17 MAR	76																	18 MAR 77		
18 MAR	77																	19 MAR 78		
19 MAR	78																	20 MAR 79		
20 MAR	79																	21 MAR 80		
21 MAR	80																	22 MAR 81		
22 MAR	81																	23 MAR 82		
23 MAR	82																	24 MAR 83		
24 MAR	83																	25 MAR 84		
25 MAR	84																	26 MAR 85		
26 MAR	85																	27 MAR 86		
27 MAR	86																	28 MAR 87		
28 MAR	87																	29 MAR 88		
29 MAR	88																	30 MAR 89		
30 MAR	89																	31 MAR 90		
31 MAR	90																	1 APR 91		
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
		UNIVERSAL TIME																		

SEMI-SET/SUNRISE
 TET=ILLUMI
 **SPECULAR REFLECTION AT SITE
 ECLIPSED BY EARTH
 ALTITUDE LESS THAN 0 DEG

SPOTLAP REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
83551. USA SITE = SIAL

AT 003 A 10CSP 8 (SUC 26445)

EPOCH= 1974 A1 14:17:33.6
NE 1.0314293 A= 6.2791
ANODE= 60.4435 ARGPER= 141.5672
RHO= 1.00 KAX= 330.44
OFFSET FROM ORB NOME= 0.00
L= 0.000864 T= 6.1751
M= 57.1588
UECAVE= 83.82 MISALGNAX= 0.00
LONG FROM ANODE= 0.00

SATELLITE GRAPHIC TIME TABLE
FROM FEB 1977 THROUGH FEB 1977

	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	1977
1 FEB 32	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	2 FEB 33
2 FEB 33	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	3 FEB 34
3 FEB 34	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4 FEB 35
4 FEB 35	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5 FEB 36
5 FEB 36	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	6 FEB 37
6 FEB 37	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	7 FEB 38
7 FEB 38	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	8 FEB 39
8 FEB 39	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	9 FEB 40
9 FEB 40	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	10 FEB 41
10 FEB 41	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	11 FEB 42
11 FEB 42	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	12 FEB 43
12 FEB 43	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	13 FEB 44
13 FEB 44	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	14 FEB 45
14 FEB 45	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	15 FEB 46
15 FEB 46	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	16 FEB 47
16 FEB 47	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	17 FEB 48
17 FEB 48	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	18 FEB 49
18 FEB 49	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	19 FEB 50
19 FEB 50	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	20 FEB 51
20 FEB 51	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	21 FEB 52
21 FEB 52	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	22 FEB 53
22 FEB 53	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	23 FEB 54
23 FEB 54	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	24 FEB 55
24 FEB 55	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	25 FEB 56
25 FEB 56	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	26 FEB 57
26 FEB 57	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	27 FEB 58
27 FEB 58	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	28 FEB 59
28 FEB 59	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	1 MAR 60

S= SUNSET/SUNRISE
T= TWILIGHT
* = SPECULAR REFLECTION AT SITE
E = ECLIPSED BY EARTH
X = ALTITUDE LESS THAN 0 DEG

SPECIAL REFLECTION FROM CYLINDRICAL SATELLITE, SPIN AXIS = SYMMETRY AXIS
 A3550. USA
 DESITA 67 003 C 10CSP 10 (SCC 2650)

EPOCH= 1977 1 0: 0: 0.0 I= 7.6918
 N= 1.00218792 A= 6.2850 E= 0.0029845
 ANODE= 45.9669 ARGPEM= 94.7935 M= 239.3822
 RHO= 1.00 RMAX= 315.97 DECA= 62.11 MISALGNAX= 0.00
 OFFSET FROM ORB NOML= 0.00 LONG FROM ANODE= 0.00

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH FEB 1977

	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	1977
1 FEB 30																		2 FEB 33
2 FEB 31																		3 FEB 34
3 FEB 32																		4 FEB 35
4 FEB 33																		5 FEB 36
5 FEB 34																		6 FEB 37
6 FEB 35																		7 FEB 38
7 FEB 36																		8 FEB 39
8 FEB 37																		9 FEB 40
9 FEB 38																		10 FEB 41
10 FEB 39																		11 FEB 42
11 FEB 40																		12 FEB 43
12 FEB 41																		13 FEB 44
13 FEB 42																		14 FEB 45
14 FEB 43																		15 FEB 46
15 FEB 44																		16 FEB 47
16 FEB 45																		17 FEB 48
17 FEB 46																		18 FEB 49
18 FEB 47																		19 FEB 50
19 FEB 48																		20 FEB 51
20 FEB 49																		21 FEB 52
21 FEB 50																		22 FEB 53
22 FEB 51																		23 FEB 54
23 FEB 52																		24 FEB 55
24 FEB 53																		25 FEB 56
25 FEB 54																		26 FEB 57
26 FEB 55																		27 FEB 58
27 FEB 56																		28 FEB 59
28 FEB 57																		1 MAR 60
29 FEB 58																		
30 FEB 59																		
1 MAR 60																		

S=SUNSET/SUNRISE
 T=TWILIGHT
 *SPECIAL REFLECTION AT SITE
 F=ECLIPSED BY EARTH
 X=ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS

AS49. JSA SITE: SIAL

DESIGN 67 003 11 (SNC 2641)

EPACHE 1975 300 3:32: 2.0 E= 0.0035769 T= 7.1250
M= 1.0a101634 A= 6.2875
ANODE= 51.9831 ARGPE= 71.0101

RM=AE 1.00 NAAE= 0.00 DECAE= 0.00 MISALGNAX= 0.00
OFFSET FROM ORB NORALE= 84.42 LONG FROM ANODE= 308.63

SATELLITE GRAPHIC TIME TABLE
FROM FEB 1977 THROUGH FEB 1977

	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 FEB 32	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
2 FEB 33	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
3 FEB 34	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
4 FEB 35	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
5 FEB 36	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
6 FEB 37	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
7 FEB 38	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
8 FEB 39	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
9 FEB 40	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
10 FEB 41	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
11 FEB 42	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
12 FEB 43	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
13 FEB 44	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
14 FEB 45	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
15 FEB 46	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
16 FEB 47	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
17 FEB 48	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
18 FEB 49	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
19 FEB 50	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
20 FEB 51	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
21 FEB 52	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
22 FEB 53	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
23 FEB 54	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
24 FEB 55	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
25 FEB 56	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
26 FEB 57	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
27 FEB 58	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
28 FEB 59	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
1 MAR 60	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

S=SUNSET/SUNRISE
T=TWILIGHT
*S=SPECULAR REFLECTION AT SITE
E=ECLIPSED BY EARTH
X=ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE, SPIN AXIS = SYMMETRY AXIS
 31548. HISA SITE= STAL
 ORBITA 67 003 E INOSP 12 (SOC 2642)

EPOCH= 1975 25 0: 0: 0.0
 ME 1.07945719 AE 6.2936 LE 0.0051696 I= 5.9630
 ANGLE= 54.6107 ARGPER= 182.3763 ME 48.2211
 RHOA= 1.00 HADY= 324.61 DECA= 84.04 MISALGNAX= 9.00
 OFFSET FROM ORB NOME= 0.00 LONG FROM ANQUE= 0.00

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH FEB 1977

	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	*1977*
1 FEB 32	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	2 FEB 33	
2 FEB 33	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	3 FEB 34	
3 FEB 34	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4 FEB 35	
4 FEB 35	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5 FEB 36	
5 FEB 36	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	6 FEB 37	
6 FEB 37	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	7 FEB 38	
7 FEB 38	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	8 FEB 39	
8 FEB 39	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	9 FEB 40	
9 FEB 40	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	10 FEB 41	
10 FEB 41	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	11 FEB 42	
11 FEB 42	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	12 FEB 43	
12 FEB 43	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	13 FEB 44	
13 FEB 44	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	14 FEB 45	
14 FEB 45	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	15 FEB 46	
15 FEB 46	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	16 FEB 47	
16 FEB 47	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	17 FEB 48	
17 FEB 48	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	18 FEB 49	
18 FEB 49	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	19 FEB 50	
19 FEB 50	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	20 FEB 51	
20 FEB 51	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	21 FEB 52	
21 FEB 52	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	22 FEB 53	
22 FEB 53	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	23 FEB 54	
23 FEB 54	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	24 FEB 55	
24 FEB 55	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	25 FEB 56	
25 FEB 56	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	26 FEB 57	
26 FEB 57	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	27 FEB 58	
27 FEB 58	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	28 FEB 59	
28 FEB 59	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	29 FEB 60	
29 FEB 60	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	1 MAR 61	

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																

S= SUNSET/SUNRISE
 T= TWILIGHT
 * = SPECULAR REFLECTION AT SITE
 E = ECLIPSED BY EARTH
 X = ALTITUDE LESS THAN 0 DEG

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PCACHE= 1976 290
A= 1.07745777
UNNOE= 47.3056
5:20:22.9
L= 0.0076861
M= 328.0781
I= 7.7132
DEAD= 1.00
OFFSET FROM ORB
UCRML= 0.00
DECA= 82.29
LONG FROM ANOUE=
MISALGNAX=
0.00

```

[illegible]

S=SUNSET/SUNRISE
T=TWILIGHT
*==SPECULAR REFLECTION AT SITE
E=ECLIPSED BY EARTH
X=ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 1977
 DESITA 67 003 6 IOCSP 14 (SFC 2654) SITE: SIAL

POC= 1976 294 9: 9:13.4
 I= 1.07510419 A= 6.3106
 MODE= 47.1327 ARGPEM= 25.5366
 RAAX= 317.13 DECA= 82.32 MISALGNAX= 0.00
 WFESET FROM ORR NORMLE= 0.00 LONG FROM ANOU= 0.00

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH FEB 1977

	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	1977
1 FEB 32	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	2 FEB 33
2 FEB 33	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	3 FEB 34
3 FEB 34	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4 FEB 35
4 FEB 35	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5 FEB 36
5 FEB 36	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	6 FEB 37
6 FEB 37	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	7 FEB 38
7 FEB 38	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	8 FEB 39
8 FEB 39	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	9 FEB 40
9 FEB 40	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	10 FEB 41
10 FEB 41	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	11 FEB 42
11 FEB 42	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	12 FEB 43
12 FEB 43	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	13 FEB 44
13 FEB 44	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	14 FEB 45
14 FEB 45	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	15 FEB 46
15 FEB 46	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	16 FEB 47
16 FEB 47	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	17 FEB 48
17 FEB 48	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	18 FEB 49
18 FEB 49	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	19 FEB 50
19 FEB 50	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	20 FEB 51
20 FEB 51	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	21 FEB 52
21 FEB 52	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	22 FEB 53
22 FEB 53	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	23 FEB 54
23 FEB 54	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	24 FEB 55
24 FEB 55	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	25 FEB 56
25 FEB 56	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	26 FEB 57
26 FEB 57	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	27 FEB 58
27 FEB 58	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	28 FEB 59
28 FEB 59	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	1 MAR 60

S=SUNSET/SUNRISE
 T=TILIGHT
 *S=SPECULAR REFLECTION AT SITE
 E=ECLIPSED BY EARTH
 X=ALTITUDE LESS THAN 0 DEG

SPICULAR REFLECTION FROM CYLINDRICAL SATELLITE, SPIN AXIS = SYMMETRY AXIS
 3544, USA SITE= STAL
 RESTT 67 066 A IUCSP 16 (SIC 2062)

EP0CH= 1976 275 0: 0: 0.0
 N= 1.09955460 A= 6.2167 I= 0.2349
 INJUE= 46.5782 ARGPE= 236.6675 M= 61.4320
 H0AA= 1.00 HAA= 356.58 DECA= 49.77 MISALGNAX= 0.00
 OFFSET FROM ORH NGRML= 0.00 LONG FROM ANODE= 0.00

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH FEB 1977

	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	1977
1 FEB 32	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	2 FEB 33	
2 FEB 33	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	3 FEB 34	
3 FEB 34	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4 FEB 35	
4 FEB 35	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5 FEB 36	
5 FEB 36	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	6 FEB 37	
6 FEB 37	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	7 FEB 38	
7 FEB 38	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	8 FEB 39	
8 FEB 39	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	9 FEB 40	
9 FEB 40	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	10 FEB 41	
10 FEB 41	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	11 FEB 42	
11 FEB 42	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	12 FEB 43	
12 FEB 43	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	13 FEB 44	
13 FEB 44	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	14 FEB 45	
14 FEB 45	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	15 FEB 46	
15 FEB 46	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	16 FEB 47	
16 FEB 47	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	17 FEB 48	
17 FEB 48	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	18 FEB 49	
18 FEB 49	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	19 FEB 50	
19 FEB 50	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	20 FEB 51	
20 FEB 51	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	21 FEB 52	
21 FEB 52	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	22 FEB 53	
22 FEB 53	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	23 FEB 54	
23 FEB 54	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	24 FEB 55	
24 FEB 55	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	25 FEB 56	
25 FEB 56	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	26 FEB 57	
26 FEB 57	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	27 FEB 58	
27 FEB 58	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	28 FEB 59	
28 FEB 59	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	1 MAR 60	

	9	10	11	12	13	14	15
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2							
3							
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6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

1977

UNIVERSAL TIME

S=SUNSET/SUNRISE
 T=TAILLIGHT
 *S=SPECULAR REFLECTION AT SITE
 E=ECLIPSED BY EARTH
 X=ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 93541. SITE = STAL
 NESTTA 48 050 0 IODEP 23 (SDC 3247)

POC= 1976 352 15:24:58.0
 I= 1.01460593 A= 6.5590 E= 0.000490 I= 0.2643
 MODE= 271.1139 ARPE= 174.9760 M= 165.0324
 H000= 1.00 MAX= 161.11 DECA= 89.74 MISALNAX= 0.00
 JFSET FROM ORR MORALE= 0.00 LONG FROM ANQUE= 0.00

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH FEB 1977

	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	1977
1 FEB 32	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2 FEB 33
2 FEB 33	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3 FEB 34
3 FEB 34	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4 FEB 35
4 FEB 35	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5 FEB 36
5 FEB 36	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6 FEB 37
6 FEB 37	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7 FEB 38
7 FEB 38	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8 FEB 39
8 FEB 39	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	9 FEB 40
9 FEB 40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10 FEB 41
10 FEB 41	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11 FEB 42
11 FEB 42	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12 FEB 43
12 FEB 43	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13 FEB 44
13 FEB 44	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14 FEB 45
14 FEB 45	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15 FEB 46
15 FEB 46	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16 FEB 47
16 FEB 47	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17 FEB 48
17 FEB 48	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18 FEB 49
18 FEB 49	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19 FEB 50
19 FEB 50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20 FEB 51
20 FEB 51	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21 FEB 52
21 FEB 52	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22 FEB 53
22 FEB 53	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23 FEB 54
23 FEB 54	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24 FEB 55
24 FEB 55	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	25 FEB 56
25 FEB 56	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	26 FEB 57
26 FEB 57	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	27 FEB 58
27 FEB 58	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	28 FEB 59
28 FEB 59	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1 MAR 60

SUNSET/SUNRISE
 TWILIGHT
 *SPECIAL REFLECTION AT SITE
 *ECLIPSED BY EARTH
 *ALTITUDE LESS THAN 0 DEG

SPECULAR REFLECTION FROM CYLINDRICAL SATELLITE. SPIN AXIS = SYMMETRY AXIS
 83506. USA SITE= STAL
 MESITA 68 050 E IDOSP 24 (SUC 328A)

POCHE= 1976.344 0: 0: 0.0
 L= 0.0091757 I= 2.4326
 A= 6.6641
 M= 205.6774
 INODE= 276.3216 ARGPE= 70.3699

INOM= 1.00 RAAX= 186.38 DECA= 87.57 MISALGNAX= 0.00
 OFFSET FROM ORB NORMLE= 0.00 LONG FROM ANODE=

SATELLITE GRAPHIC TIME TABLE
 FROM FEB 1977 THROUGH FEB 1977

	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	1977
1 FEB 32	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	2 FEB 33
2 FEB 33	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	3 FEB 34
3 FEB 34	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4 FEB 35
4 FEB 35	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5 FEB 36
5 FEB 36	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	6 FEB 37
6 FEB 37	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	7 FEB 38
7 FEB 38	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	8 FEB 39
8 FEB 39	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	9 FEB 40
9 FEB 40	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	10 FEB 41
10 FEB 41	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	11 FEB 42
11 FEB 42	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	12 FEB 43
12 FEB 43	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	13 FEB 44
13 FEB 44	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	14 FEB 45
14 FEB 45	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	15 FEB 46
15 FEB 46	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	16 FEB 47
16 FEB 47	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	17 FEB 48
17 FEB 48	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	18 FEB 49
18 FEB 49	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	19 FEB 50
19 FEB 50	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	20 FEB 51
20 FEB 51	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	21 FEB 52
21 FEB 52	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	22 FEB 53
22 FEB 53	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	23 FEB 54
23 FEB 54	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	24 FEB 55
24 FEB 55	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	25 FEB 56
25 FEB 56	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	26 FEB 57
26 FEB 57	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	27 FEB 58
27 FEB 58	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	28 FEB 59
28 FEB 59	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	1 MAR 60

S= SUNSET/SUNRISE
 T= TWILIGHT
 * = SPECULAR REFLECTION AT SITE
 E = ECLIPSED BY EARTH
 X = ALTITUDE LESS THAN 0 DEG

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